

**DART**

DESIGN #	DRAWN BY CB	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED JH	APPROVED #	DRAWING NO. D3140	REV. F SHEET 1 OF 7
DATE 06.10.06		TITLE DOOR	SCALE NTS
A	02.04.18	NEW ISSUE	
B	03.01.23	REMOVE -65/-81/-83; ADD -301/-303	
C	04.11.08	CHANGE DELASTEK SPEC. TEC-77; ADD PART MARKING; ADD NOTES 11, 12, 13; CHANGE ANGLE -95/-97/-98 TO 106°	
D	05.11.23	ADD -103/-104/-105/-106; REMOVE -67	
E	06.06.09	1.75 WAS 1.88, 4.75 WAS 4.13 ON -08/-07, 1.00 WAS 1.20 ON -09/-10	
F	06.10.06	ADD NOTE 14; CORRECT PART TITLE, NOW D3140-09/-92/-104 SHOWN D3140-10/-91/-103 OPPOSITE	

**RELEASED**

06.11.13

QTY -05	QTY -06	QTY -07	QTY -08	QTY -09	QTY -10	PART NUMBER	DESCRIPTION
X						D3140-05	DOOR
	X					D3140-06	DOOR
		X				D3140-07	DOOR
			X			D3140-08	DOOR
		1		X		D3140-09	DOUBLER ASSEMBLY
			1		X	D3140-10	DOUBLER ASSEMBLY
3	3					D3140-57	PAD
1	1					D3140-59	PAD
2	2					D3140-61	PAD
2	2					D3140-63	PAD
		1	1			D3140-69	PAD
		1	1			D3140-71	PAD
		1	1			D3140-73	PAD
		1	1			D3140-75	PAD
		1	1			D3140-77	PAD
		1	1			D3140-79	PAD
				1	1	D3140-85	ANGLE
1	1					D3140-87	DOUBLER
				1	1	D3140-89	DOUBLER
		1				D3140-91	DOUBLER
			1			D3140-92	DOUBLER
3	3					D3140-95	DOUBLER
1						D3140-97	DOUBLER
	1					D3140-98	DOUBLER
		1	1			D3140-99	DOUBLER
		2	2			D3140-101	DOUBLER
		1				D3140-103	DOUBLER
			1			D3140-104	DOUBLER
		1				D3140-105	DOUBLER
			1			D3140-106	DOUBLER
1	1					D3140-241	DOUBLER
1		1				D3140-301	DOUBLER
	1		1			D3140-303	DOUBLER
				5	5	MS20426AD3-4	RIVET

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CHECKED JH	APPROVED #	DRAWING NO. D3140	REV. F SHEET 2 OF 7
DATE 06.10.06		TITLE DOOR	SCALE NTS

1

COMPOSITE LAYUP & BONDING I.A.W. DELASTEK PROCESS SPEC. TEC-77  
MATERIAL STORAGE & HANDLING TO BE I.A.W. DART QSI 006  
MAIN LAYUP USES FIBERCOTE E-761/7781 EPOXY FIBERGLASS.  
FILL WITH EPOCAST 87269 OR MAGNOBOND 77 A & B AND MA560 FOAM/ NB-51/30 FOAM

2

FINISH: DUPONT HIGHBUILD GREY PRIMER 1144-S

3

MAKE PARTS IN ACCORDANCE WITH THE FOLLOWING TOOLS/MOLDS:

PART	TOOL
D3140-05	B30-23000-01T
D3140-06	B30-23000-02T
D3140-07	B30-23000-03T
D3140-08	B30-23000-04T
D3140-57	B30-23000-57T
D3140-61	B30-23000-61T
D3140-63	B30-23000-63T
D3140-69	B30-23000-69T
D3140-71	B30-23000-71T
D3140-73	B30-23000-73T
D3140-75	B30-23000-75T
D3140-77	B30-23000-77T
D3140-79	B30-23000-79T
D3140-89	D3140-89T1
D3140-301	D3140-301T1
D3140-303	D3140-303T1

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4

MATERIAL: 2024-T3 (QQ-A-250/4) 0.032 THICK (M2024T3S.032)  
FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

5

MATERIAL: 2024-T3 (QQ-A-250/4) 0.020 THICK (M2024T3S.020)  
FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

6

MATERIAL: 5052-H32/H34 (QQ-A-250/8) 0.040 THICK (M5052H32S.040)  
FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

7

MATERIAL: POLIMEX TR75 1" THICK 4.5 LB KLEGECELL

8

ALL DIMENSIONS IN INCHES

9

TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

10

MATERIAL: 6061-T6 (QQ-A-250/11) 0.063 THICK (M6061-T6S.063)  
FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

11

DOUBLER TO SIT ON TOP OF FOAM AT THIS LOCATION

12

DOUBLER TO BE RECESSED FLUSH INTO FOAM AT THIS LOCATION

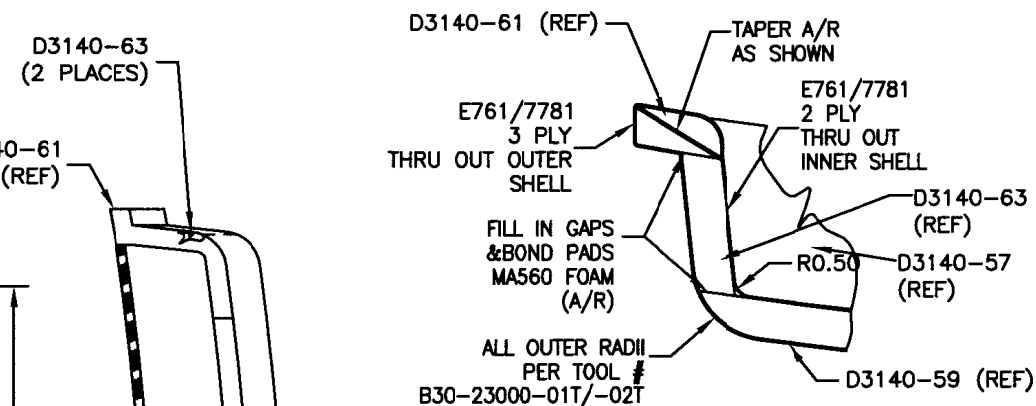
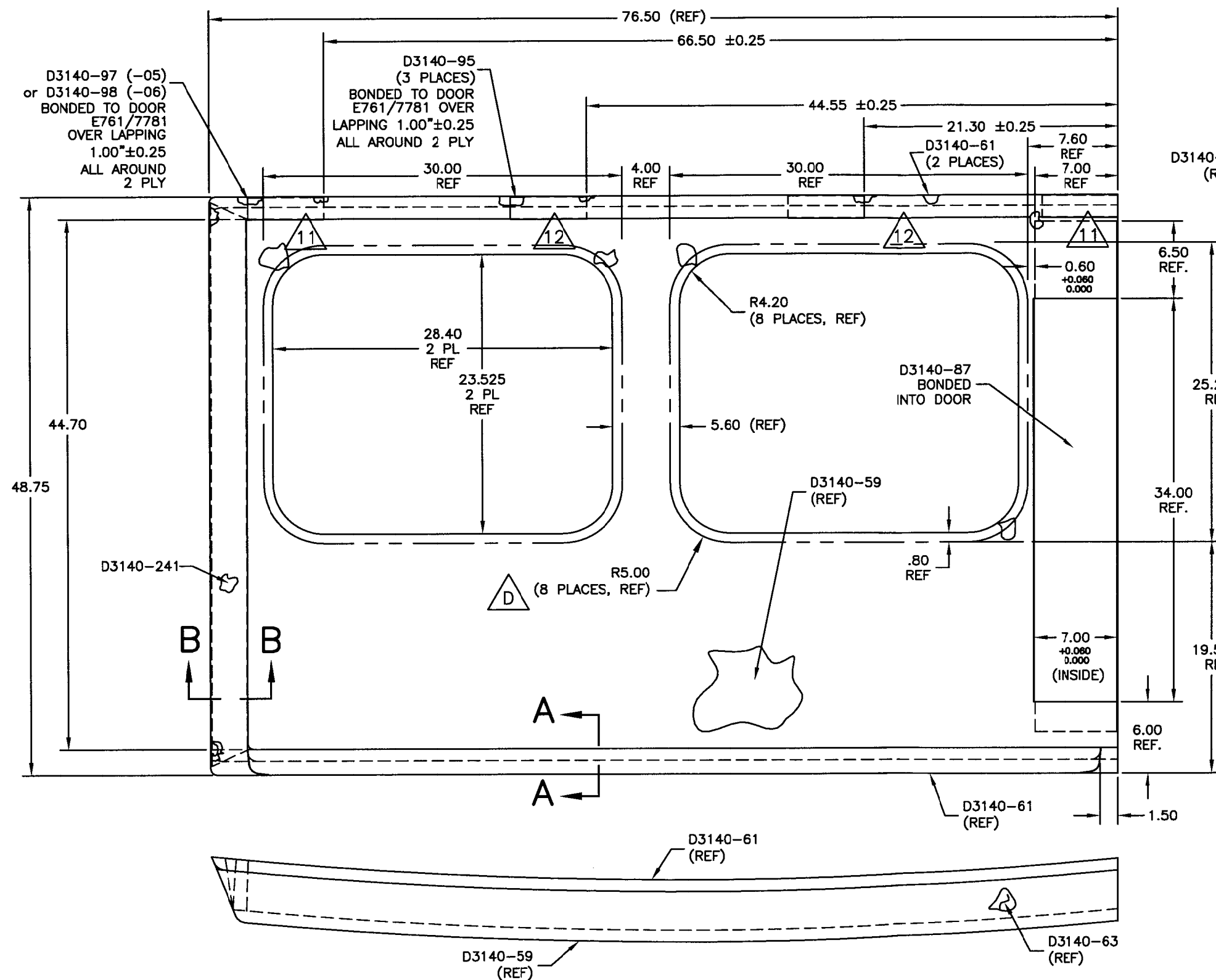
13

RUBBER STAMP WITH DART P/N D3140-05/-06/-07/-08 USING MIL-STD-130

14

PARTS MUST BE SCUFFED WITH 80 GRIT SANDPAPER PRIOR TO ACID ETCH AND  
ALODINE PER DART QSI 005 4.1

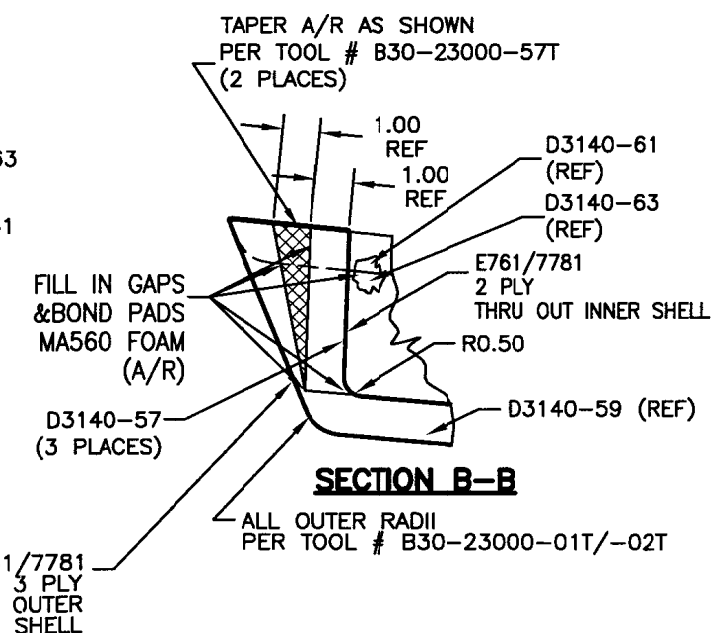
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**SECTION A-A**

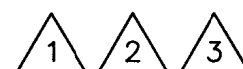
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**SECTION B-B**

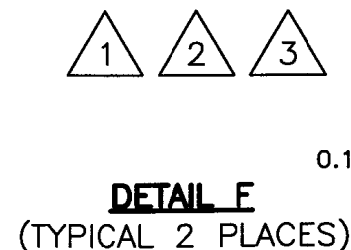
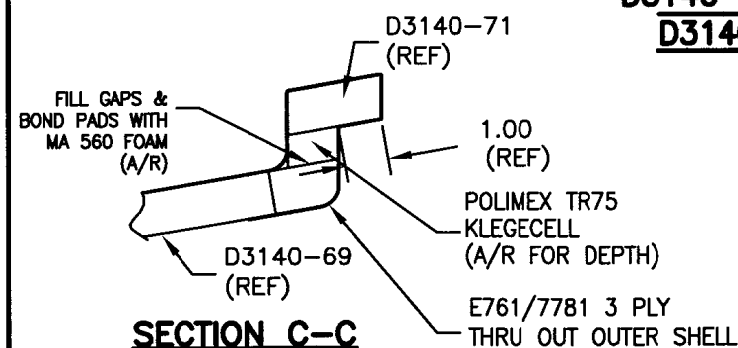
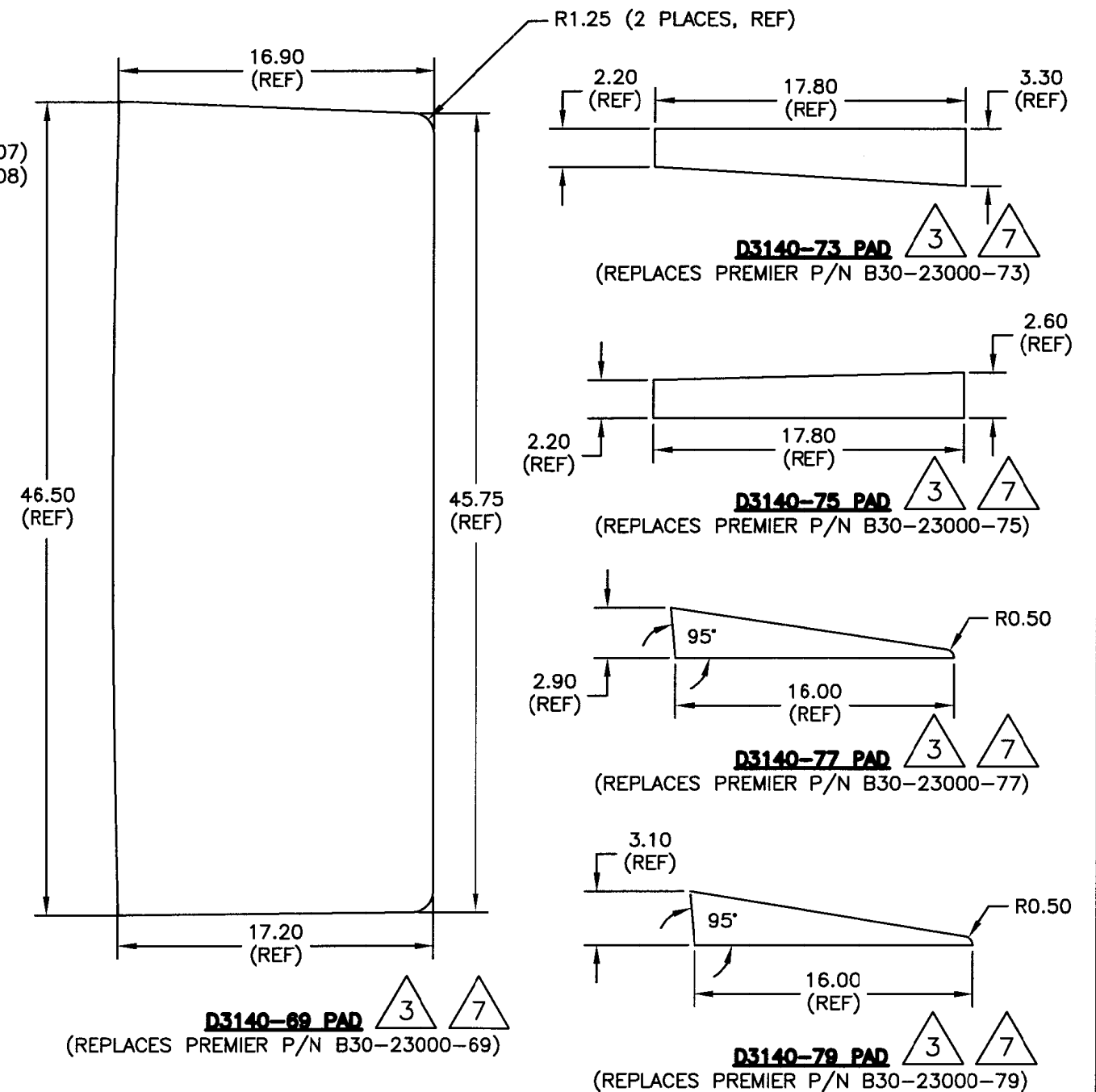
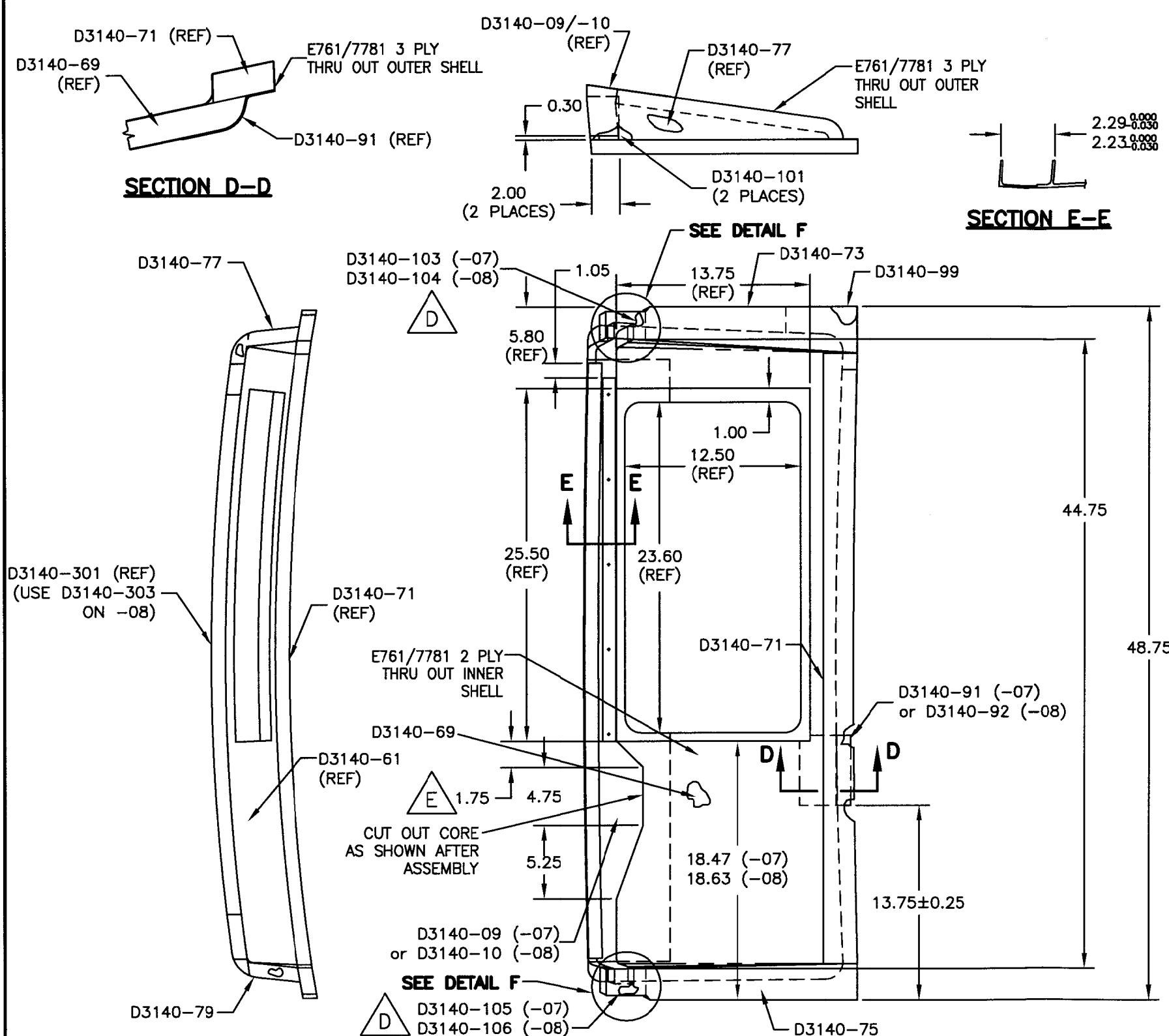
**D3140-05 DOOR (SHOWN, REPLACES PREMIER P/N B30-23000-05)**  
**D3140-06 DOOR (OPPOSITE, REPLACES PREMIER P/N B30-23000-06)**  
(WINDOWS & CUTOUTS TO BE LOCATED PER B30-23000-01T/-02T TOOL)



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CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D3140	REV. F SHEET 3 OF 7
DATE 06.10.06	TITLE DOOR	SCALE NTS	



**D3140-07 DOOR (SHOWN, REPLACES PREMIER P/N B30-23000-07)**  
**D3140-08 (OPPOSITE, REPLACES PREMIER P/N B30-23000-08)**  
 (WINDOW TO BE LOCATED BY TOOL B30-23000-03T/-04T)

D3140-103 (SHOWN)  
 D3140-104/-105/-106 (SIMILAR)  
 DOUBLER EDGE

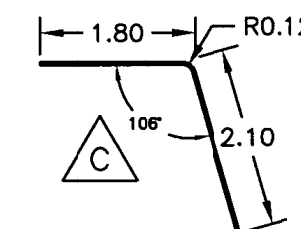
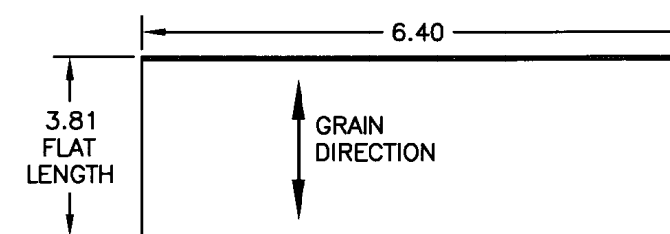
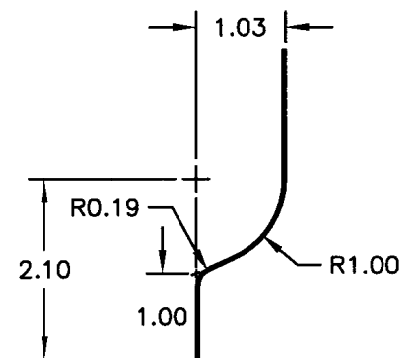
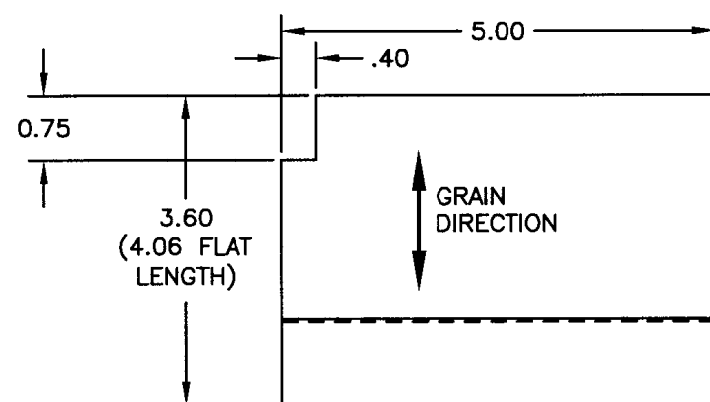
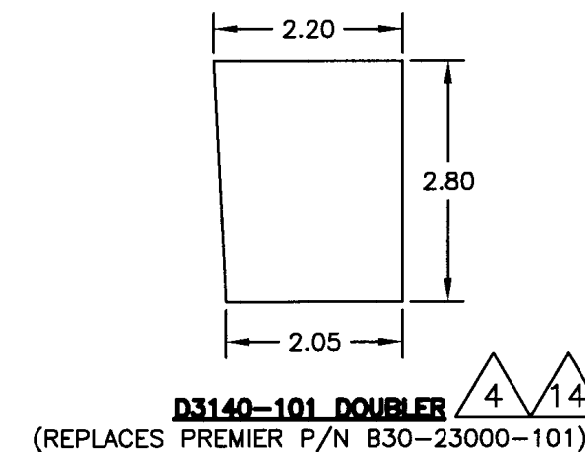
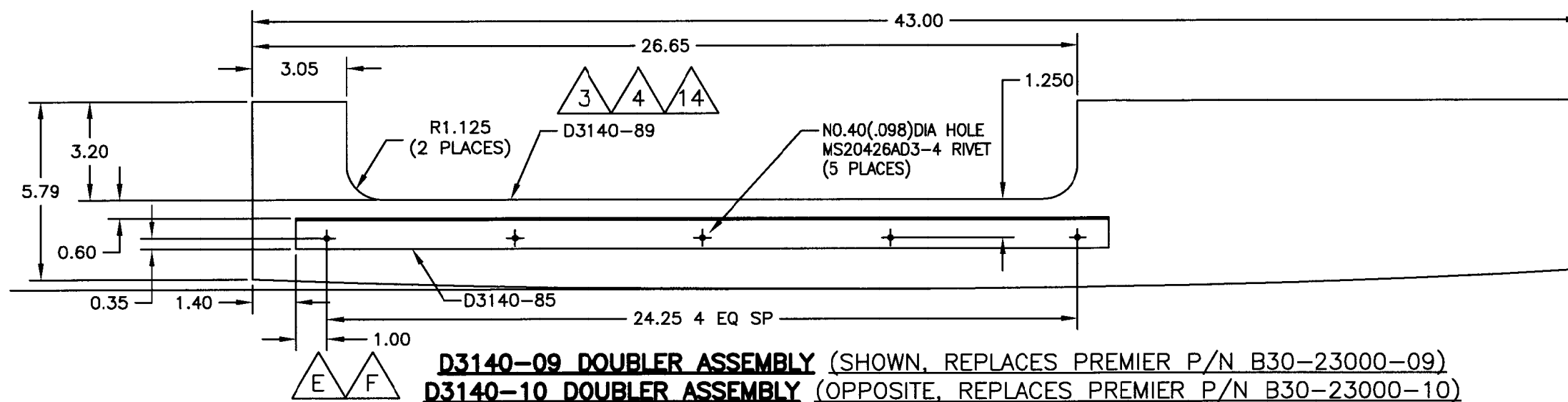
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DATE 06.10.06	TITLE DOOR	SCALE NTS	

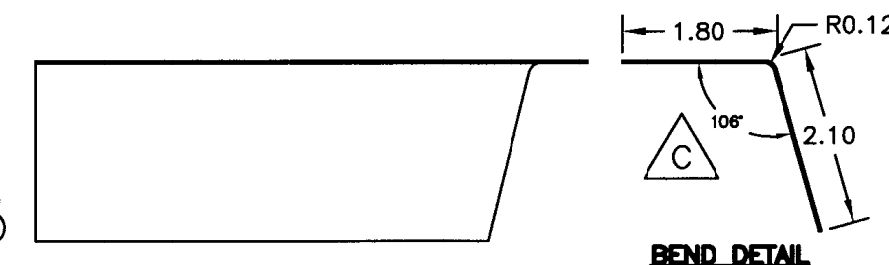
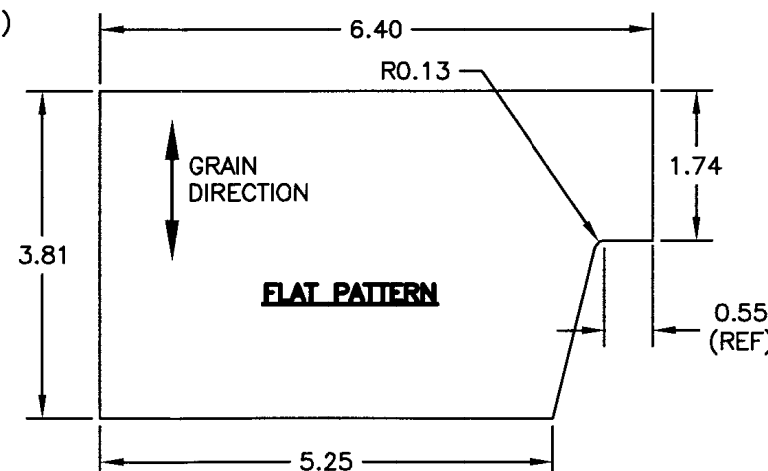
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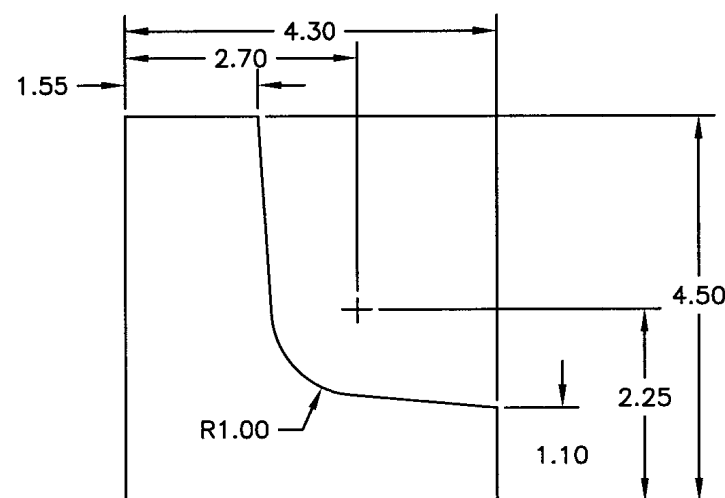
**D3140-91F FLAT PATTERN**  
 (USE TO MAKE D3140-91/-92 DOUBLERS)

**D3140-92 DOUBLER** (SHOWN, REPLACES PREMIER P/N B30-23000-92)  
**D3140-91 DOUBLER** (OPPOSITE, REPLACES PREMIER P/N B30-23000-91)



**D3140-97F FLAT PATTERN**  
 (USE TO MAKE D3140-97/-98 DOUBLERS)

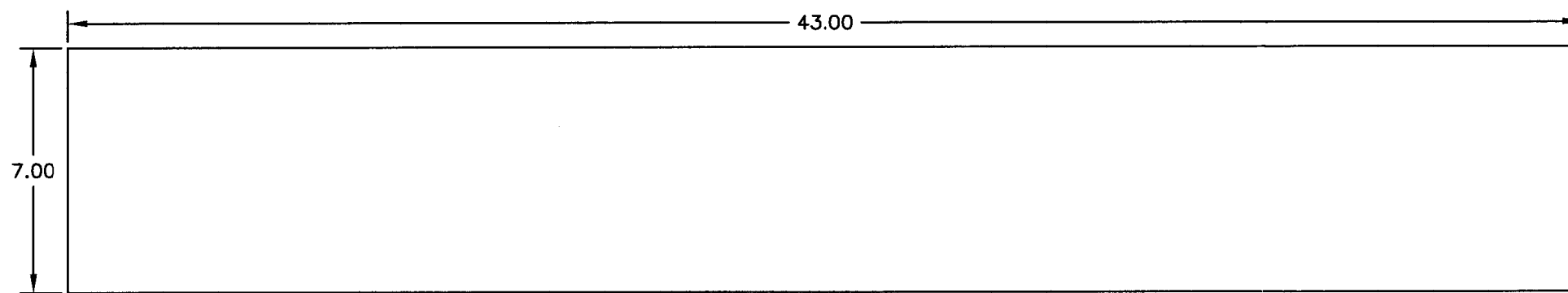
**D3140-97 DOUBLER** (SHOWN, REPLACES PREMIER P/N B30-23000-97)  
**D3140-98 DOUBLER** (OPPOSITE, REPLACES PREMIER P/N B30-23000-98)



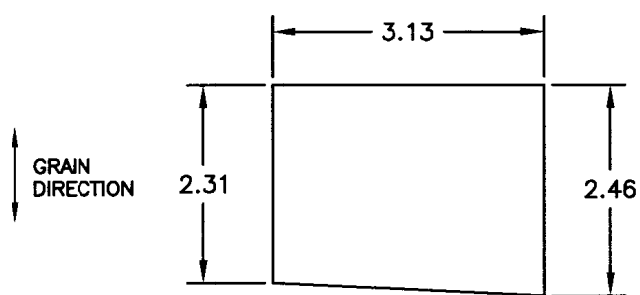
**D3140-99 DOUBLER** (REPLACES PREMIER P/N B30-23000-99)

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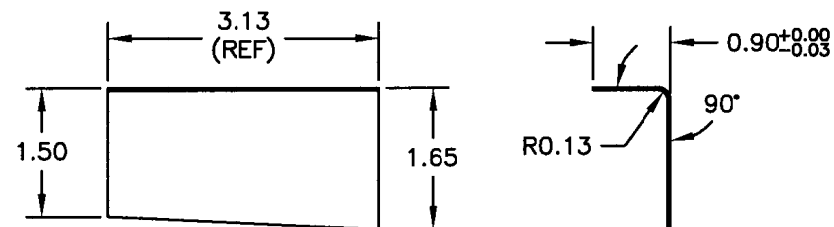
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DATE 06.10.06		TITLE DOOR		SCALE NTS	



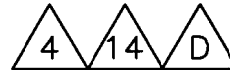
**D3140-87 DOUBLER**   
(REPLACES PREMIER P/N B30-23000-87)



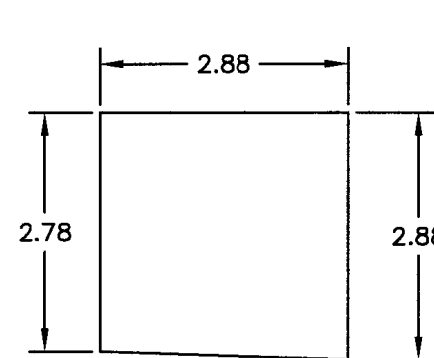
**D3140-105F FLAT PATTERN**  
(USED TO MAKE D3140-105/-106 BRACKETS)



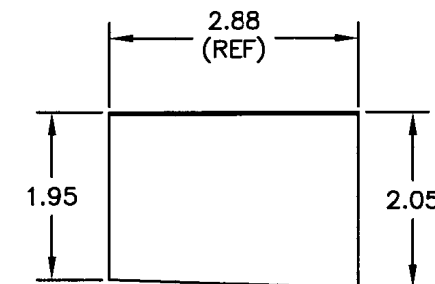
**D3140-105 DOUBLER**  
D3140-106 OPPOSITE



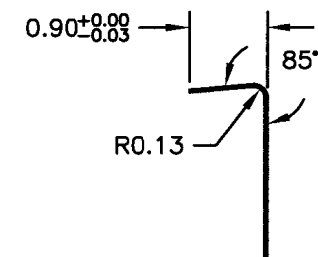
GRAIN  
DIRECTION



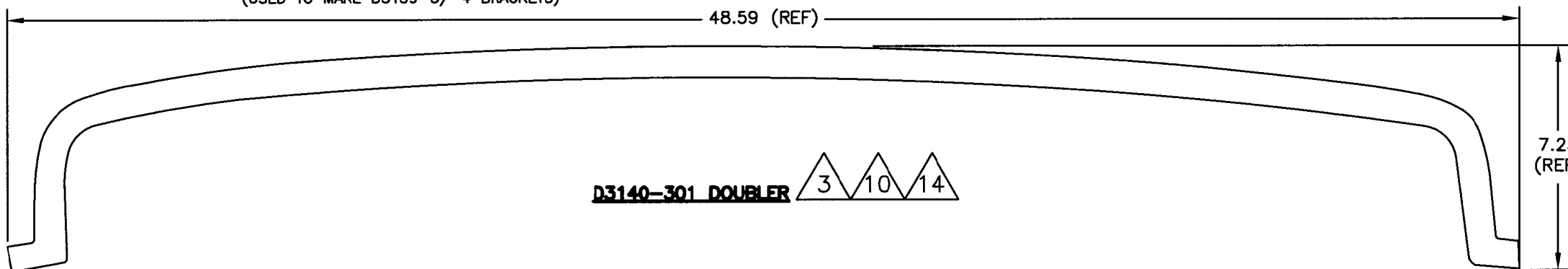
**D3140-103F FLAT PATTERN**  
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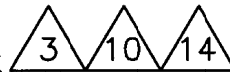
**D3140-104 DOUBLER**  
D3140-103 OPPOSITE



**D3159-3F FLAT PATTERN**  
(USED TO MAKE D3159-3/-4 BRACKETS)

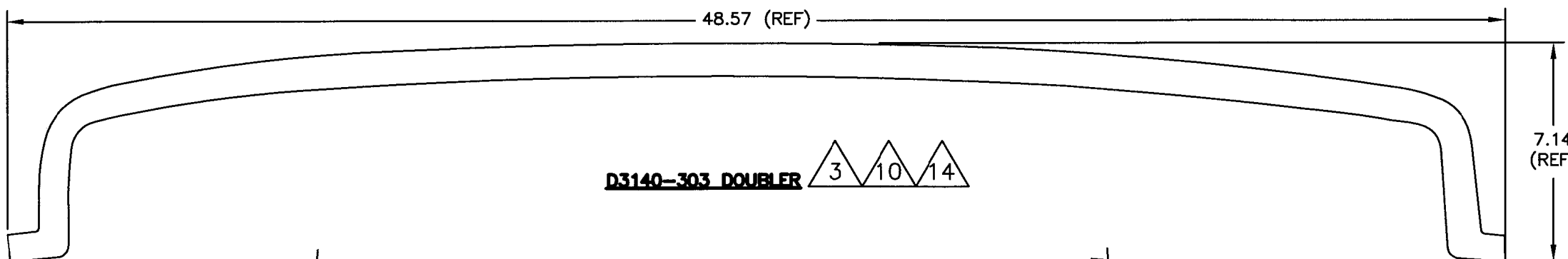


**D3140-301 DOUBLER**

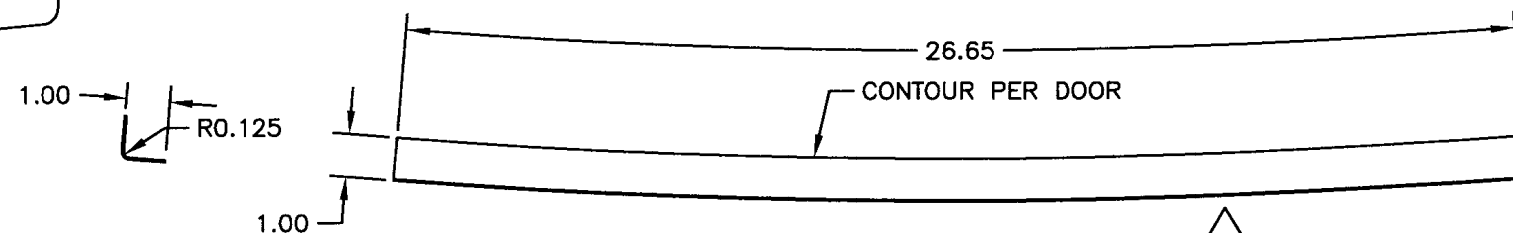
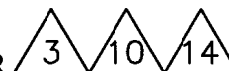


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**D3140-303 DOUBLER**



**D3140-85 ANGLE**   
FLAT PATTERN: 26.65" x 1.90"  
(REPLACES PREMIER P/N B30-23000-85)

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DESIGN

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06.10.06

**DART**

DART AEROSPACE LTD.  
HAWKESBURY, ONTARIO, CANADA

DRAWING NO.

D3140

REV. F

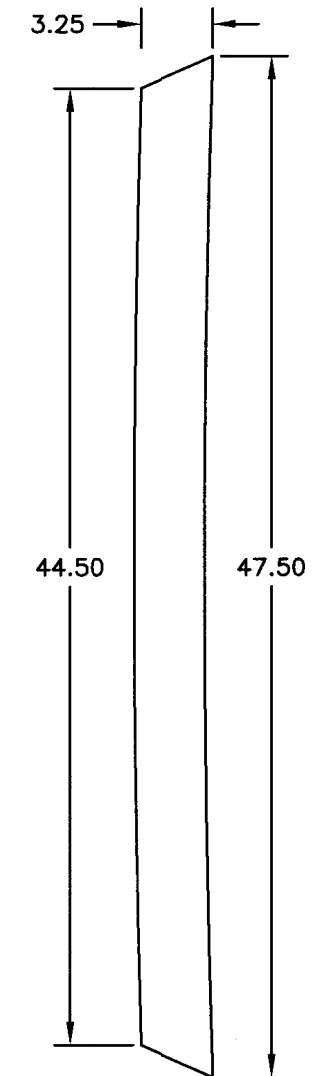
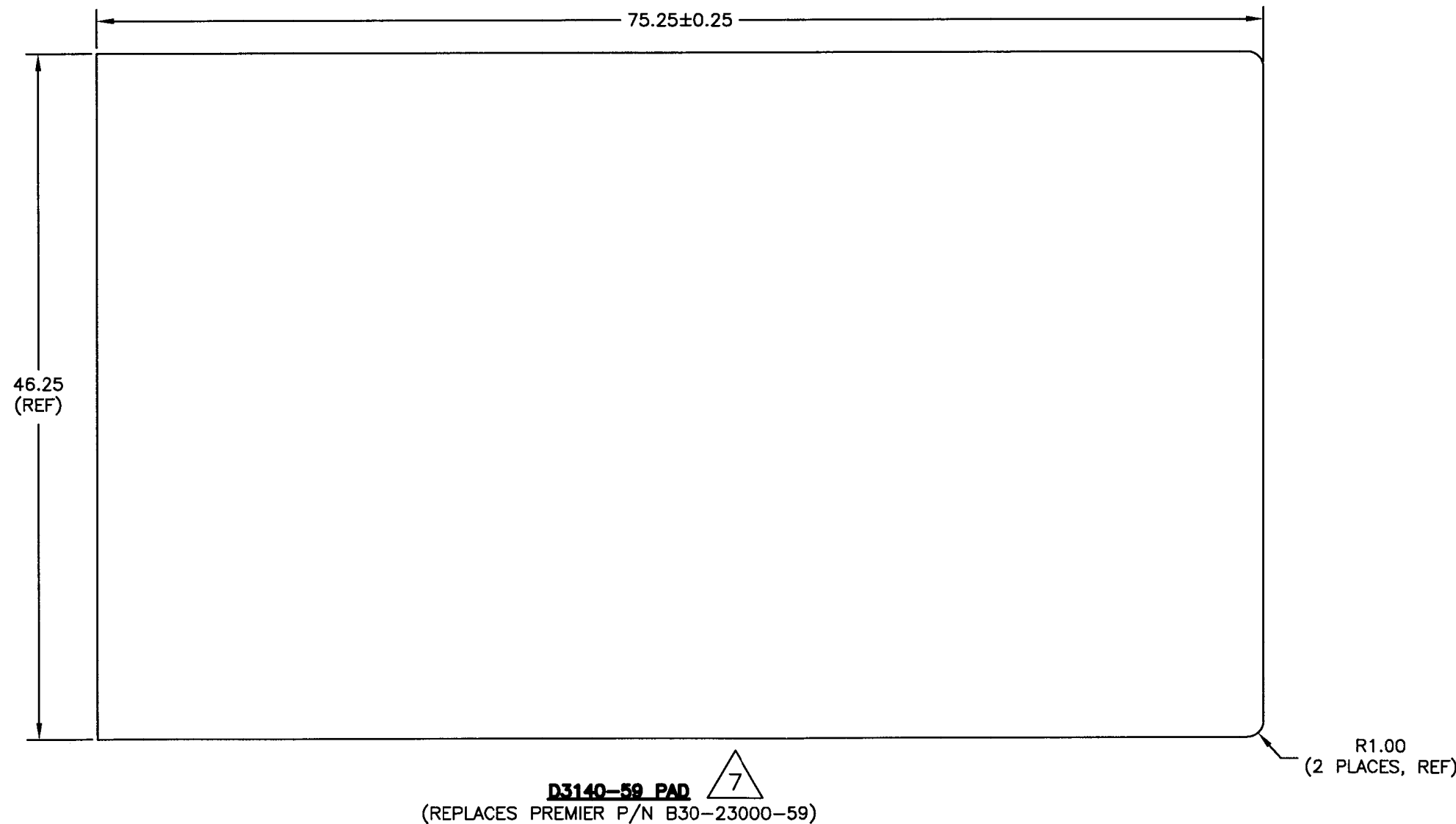
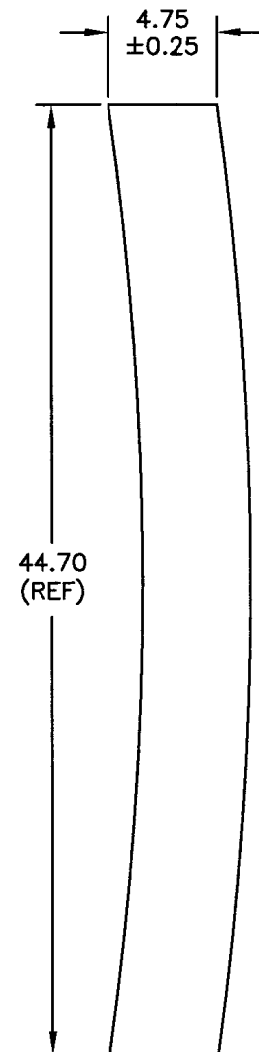
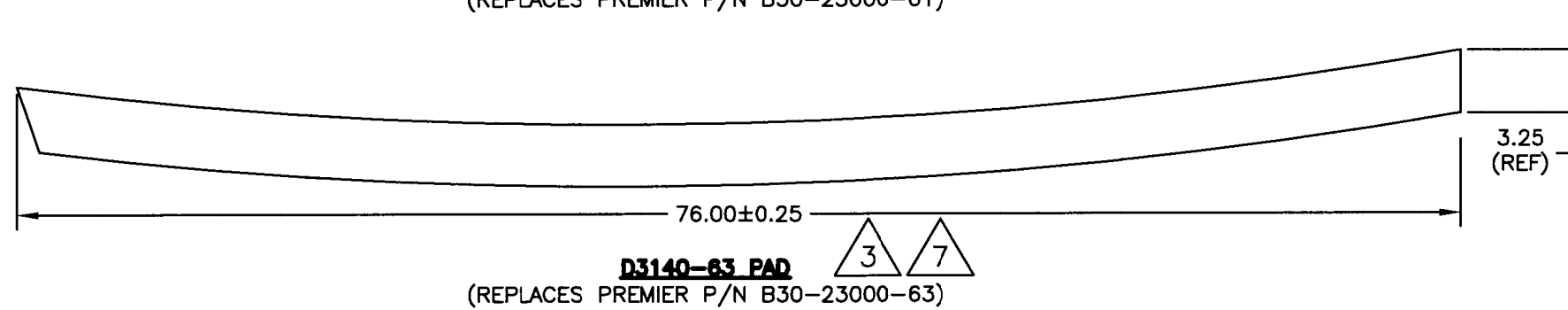
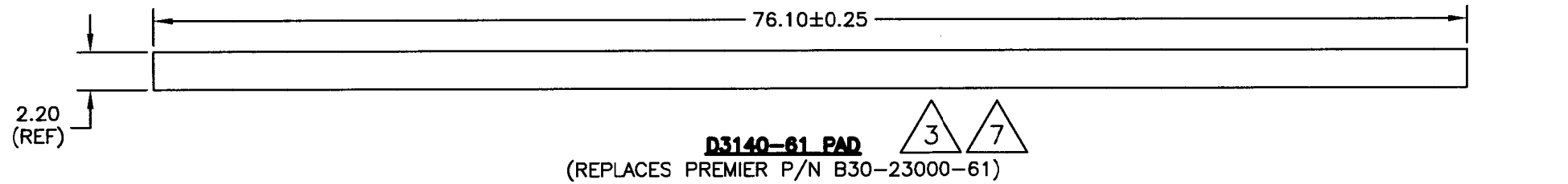
SHEET 6 OF 7

TITLE

DOOR

SCALE

NTS



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	CHECKED	APPROVED	
	DATE	TITLE	REV. F
	06.10.06	DOOR	SHEET 7 OF 7 SCALE NTS



**DELASTEK INC.**  
**Composites**

<b>Work Instruction</b>	<b>Number :</b>	<b>Tec-77</b>
<b>Manufacturing of Dart Aerospace D3140 doors</b>		
<p><b>References:</b></p> <ul style="list-style-type: none"> <li>- Dart Aerospace drawing D3140.</li> <li>- Process Specification for Manufacture Of Composite Structure 008-93001 from Premier Aviation, Inc.</li> </ul> <p><u>Dart Aerospace drawing D3140 has priority over the Premier Aviation document 008-93001.</u></p>		
<p><b>3.1 Equipment</b></p> <ul style="list-style-type: none"> <li>- White cotton gloves, lint free</li> <li>- Plastic or Teflon Spatula</li> <li>- Acrylic or Teflon bar with a narrow tip</li> <li>- Small acrylic bloc with a rounded right angle</li> <li>- Hammer</li> <li>- Heat gun</li> <li>- Teflon adhesive tape, 1 inch wide</li> <li>- Thermocouple</li> <li>- Scissors</li> <li>- Retractable knife (Exacto)</li> <li>- Band saw</li> <li>- Small hand sander</li> <li>- Sander with abrasive belt</li> <li>- Router</li> <li>- Shaper</li> <li>- Measuring tape</li> <li>- Long flexible ruler</li> <li>- Peel ply</li> <li>- Perforated film</li> <li>- Bleeder</li> <li>- Bagging</li> <li>- Tacky tape</li> </ul>		
<p><b>3.2 Material</b></p> <ul style="list-style-type: none"> <li>- Release agent, Freekote FK700</li> <li>- Prepreg fiberglass cloth Fibercote E-761/7781</li> <li>- Epoxy adhesive film, Fiber Resin PF-7035C</li> <li>- Core splice adhesive, SIA Adhesives MA560</li> <li>- Foam core, 1 inch thick, plain, Diab Klebecell TR-75</li> </ul>		





**DELASTEK INC.**  
**Composites**

- Filler, Vantico Epocast 87269-A/B
- Epoxy resin, Hysol 9309NA
- Fiberglass cloth 7781, 9oz, « S » type

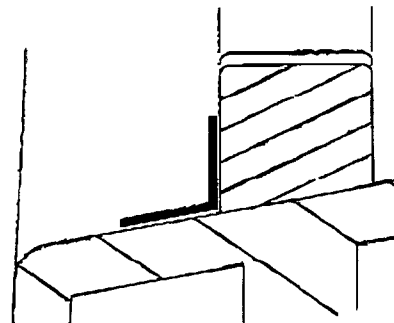
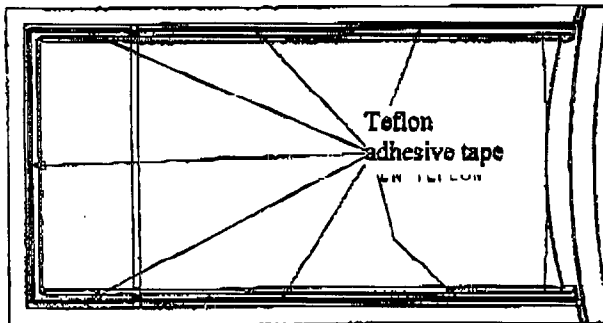
#### 4.1 Environmental requirements

Parts lay-up and bagging must only be done in the clean room.

#### 4.2 Handling

During all lay-up procedures where physical contact between the workers hands and the composite material exist, the worker must wear white cotton gloves as defined in section 3.1.

- Apply two (2) coats of release agent into the molds and their aluminum parts before the lay-up of the first shell.
- Fix the aluminum parts on the mold as indicated on the parts.
- Bond Teflon adhesive tape to seal the angle formed by the intersection between the mold and the aluminum parts installed on the flange.



All doors manufactured per this instruction must be inspected according the following criterias :

- Concordance to Dart Aerospace drawing D3140
- Presence of defaults as described in section 8.4
- Respect of the curing procedures in section 8.3
- Identification

- MRB : (material review board) Comity composed of a representative from Quality, one from Production and one from Engineering whose role is to rule on the follow-up to give to a noticed nonconformity, resulting in the establishment of a corrective and/or preventive action.

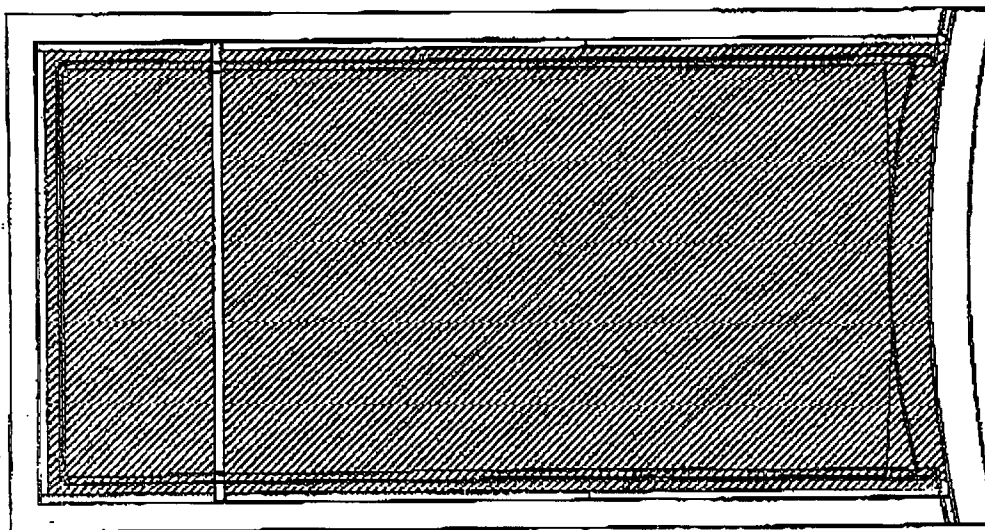


**DELASTEK INC.**  
**Composites**

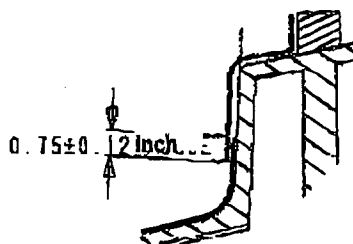
## **8.1 Part lay-up and procedures**

### **8.1.1 Lay-up of the first shell, 3 plies**

Three plies of prepreg must be applied, one by one, on all the internal surface of the mold.



Start at the bottom of the mold and go up the walls until the top of the aluminum parts. Avoid to superpose the overlaps from the different plies. Prepreg may be spliced as required using a  $0.75 \pm 0.12$  inch overlap. Avoid having more than two (2) foldings by piece of prepreg.



Lay carefully the prepreg plies to eliminate air pockets. The 90 degree corners need a particular attention. To really mold the plies against the walls in those spots and avoid the air bubbles, use an acrylic or teflon bar with a narrow end and press on the prepreg along the corners. Before doing the bagging, use an acrylic bloc with a slightly rounded 90 degree corner, press it in the corners and hit with the hammer so that the prepreg really matches the form.



**DELASTEK INC.**  
**Composites**

### 8.1.2 Foam core cutting (Klepecell)

The foam core parts corresponds to the following templated :

Parts	Templates	Quantity left	Quantity right
D3140-57	B30-23000-57T	3	3
D3140-61 (top)	B30-23000-61T (top)	1	1
D3140-61 (bottom)	B30-23000-61T (bottom)		
D3140-63 (top)	B30-23000-63T (top)	1	1
D3140-63 (bottom)	B30-23000-63T (bottom)	1	1
D3140-69	B30-23000-69T	1	1
D3140-71	B30-23000-71T	1	1
D3140-73	B30-23000-73T	1	1
D3140-75	B30-23000-75T	1	1
D3140-77	B30-23000-77T	1	1
D3140-79	B30-23000-79T	1	1

The following foam core part must be cut according to the D3140 drawing :

- D3140-59 (quantity : 1 left, 1 right)

Using a hand sander, round the edges of the parts that are in the radii so that it fits the mold surface better.

Bevel 2 of the 3 D3140-57 parts as described on the D3140 drawing.

Ajust the parts according to the mold.

### 8.1.3 Positioning of the internal components

Position the D3140-09/-10 and D3140-87 doublers according to the D3140 drawing, the trim jig and the marks on the aluminum piece that divides the two doors.

Part	Mold	Jig
D3140-09	B30-23000-01T	B30-23000-07T
D3140-10	B30-23000-02T	B30-23000-08T

Using the following trim and drill jigs, mark with a marker the position where the windows and other clearings will be situated,

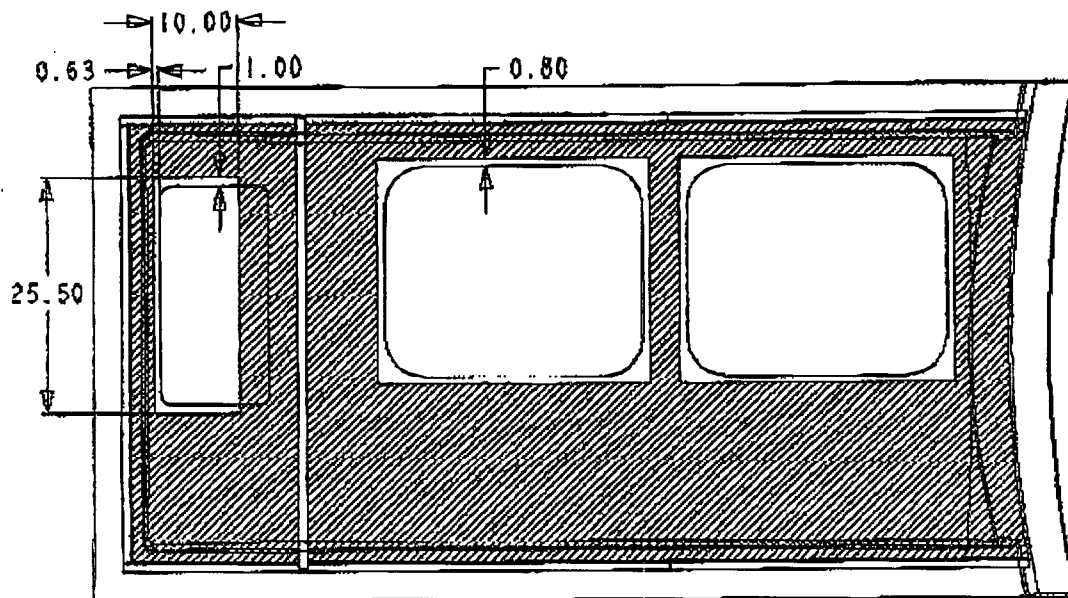


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Mold	Jigs
B30-23000-01T	B30-23000-01A
	B30-23000-03T
	B30-23000-05T (2 parts)
	B30-23000-07T
B30-23000-02T	B30-23000-02A
	B30-23000-04T
	B30-23000-06T (2 parts)
	B30-23000-08T

Use the foam core parts to simulate the offset of the jig. For orientation, the B30-23000-01T mold makes the L/H doors and the B30-23000-02T mold makes the R/H doors. The big door is toward the back and the small door is toward the front.

Afterwards, trace a rectangle offset by 0.8 inch around the previous marks for the windows of the big door and an other of 10 x 25.5 inches positioned according to the following sketch for the window of the small door.



Remove all the components on the first shell and lay one ply of adhesive film on all of the internal surface of the part except the rectangles traced before.

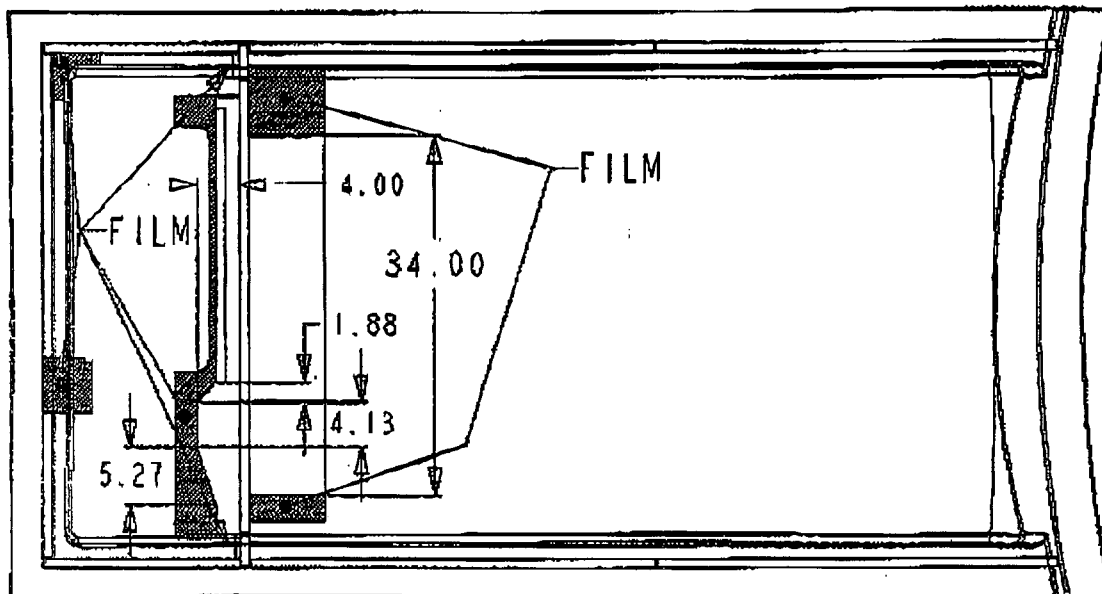
Position the D3140-09/-10 doubler according to the marks made previously and the following doublers :



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B30-23000-01T mold	B30-23000-02T mold	Quantity per mold
D3140-09	D3140-10	1
D3140-87	D3140-87	1
D3140-91	D3140-92	1
D3140-99	D3140-99	1
D3140-101	D3140-101	2
D3140-301	D3140-301	2

According to the position of the clearings determined earlier, apply adhesive film over the aluminum that will be cover by the foam core.



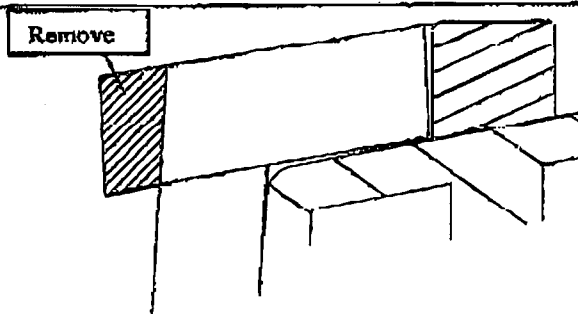
Position the D3140-59 and D3140-69 foam core parts according to the D3140 drawing. To fill the gap around the parts, twist some core splice adhesive sheet and fill the spaces. Put also some of core splice adhesive between the aluminum parts and the foam core (vertical walls only). Do not put core splice adhesive along the foam core that will be removed later to make the clearings in the part. Position all the other foam core parts and put core splice adhesive between them.

#### 8.1.4 Foam core machining

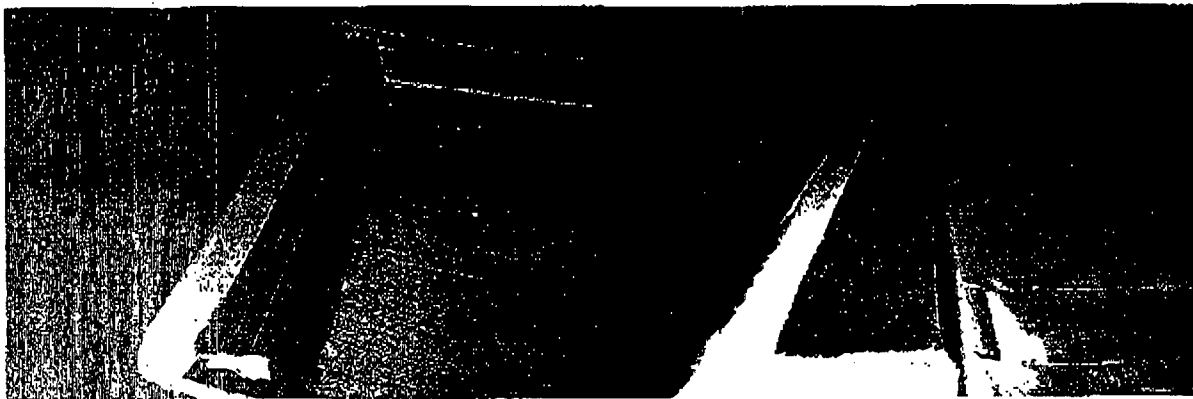
- Using a shaper with a cutter equipped with a bearing, machine the parts D3140-61, D3140-73 and D3140-75 so that they are equal to the vertical walls et make a constant wall.



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- Using a sander with an abrasive belt, machine the surface made with the D3140-57 parts so that we obtain a uniform surface equal to the two horizontal surfaces formed by the parts D3140-61 and that follows the curvature of the flange. Also, do the angle in the D3140-61 part at the bottom of the big door according to the D3140 drawing.

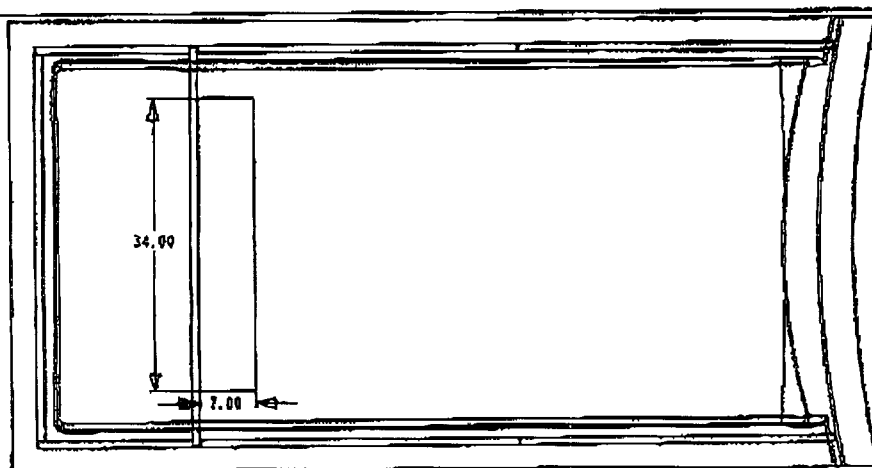


- Remove a foam core piece to do the clearing for the big door mechanism according to the D3140 drawing. Use the drill jig for positioning.

Mold	Jigs
B30-23000-01T	B30-23000-01A
B30-23000-02T	B30-23000-02A

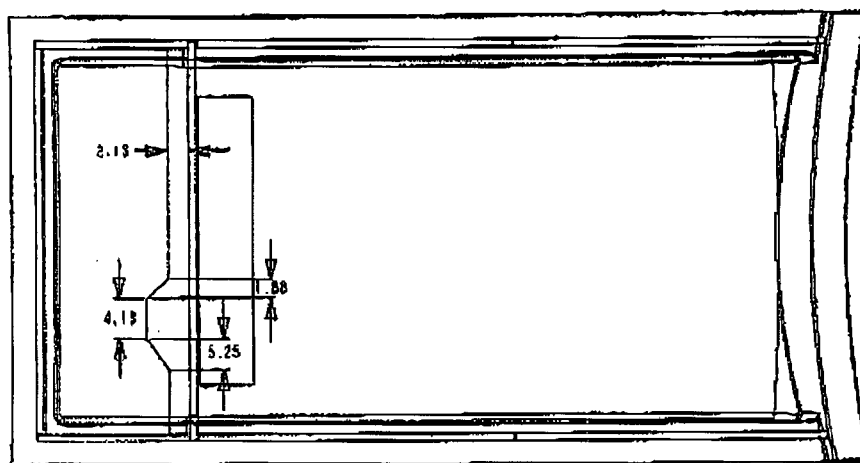


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- Remove the foam core pieces to do the clearing for the small door mechanism according to the D3140 drawing. Use the silicone form for positioning.

Mold	Jigs
B30-23000-01T	B30-23000-07T
B30-23000-02T	B30-23000-08T

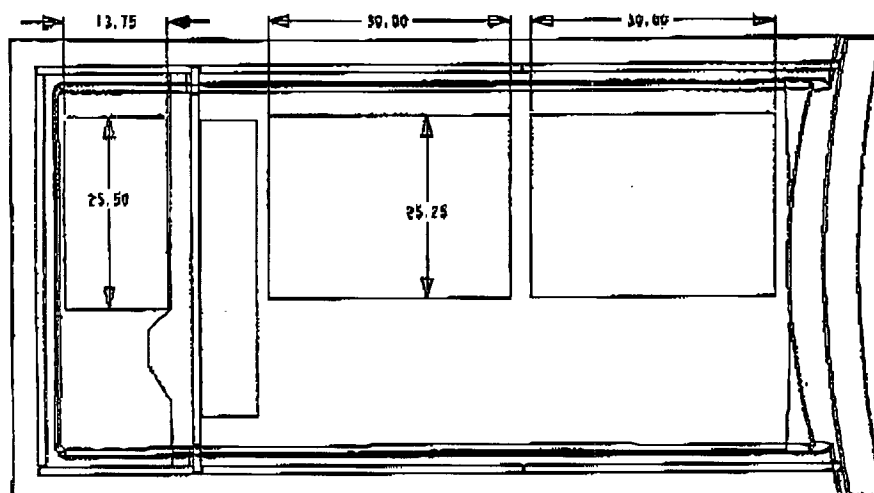


- Using the trim jigs, determine the position for the windows and cut the openings in the foam core to do the clearing around the windows.

Mold	Jigs
B30-23000-01T	B30-23000-05T (2 parts)
	B30-23000-03T
B30-23000-02T	B30-23000-06T (2 parts)
	B30-23000-04T



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- Clean the parts and the mold so that there is no more residues inside.
- Fill the voids and do the 0.5 inch radii at the bottom of the vertical walls according to the D3140 drawing using the filler.

#### 8.1.5 Lay-up of the inner shell, 2 plies

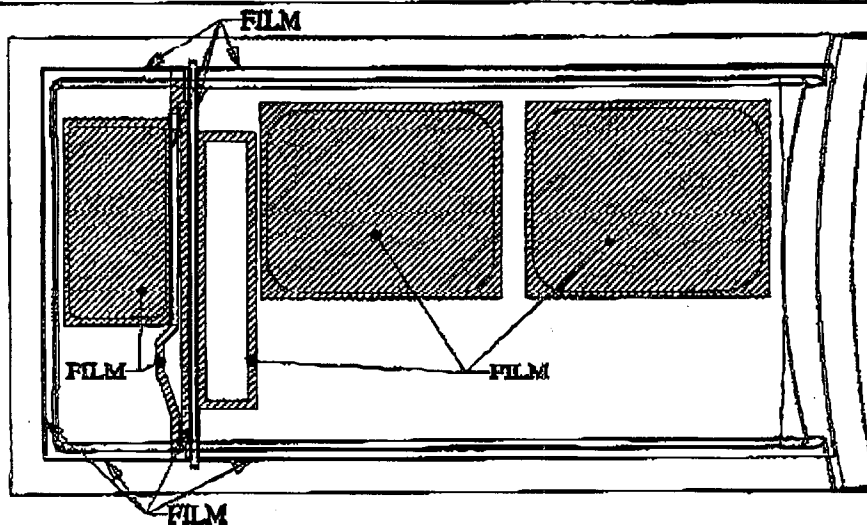
Apply adhesive film under the following doublers and position them according to the D3140 drawing.

B30-23000-01T mold	B30-23000-02T mold	Quantity per mold
D3140-67	D3140-67	2
D3140-95	D3140-95	3
D3140-97	D3140-98	1
D3140-241	D3140-241	1

Add adhesive film in the following spots :

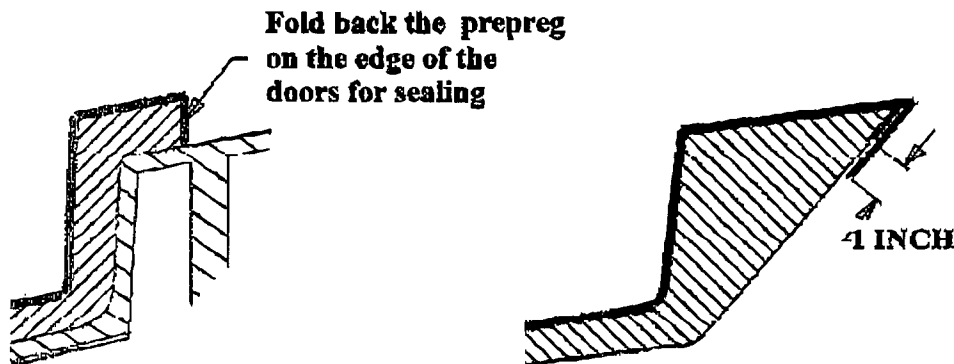
- On the doublers positioned previously
- In the clearings made for the windows
- In the clearings made for the door mechanism (1 inch strip) on the aluminum bottom and on the vertical walls where there is aluminum.
- Around the 2 doors for sealing the joint between the 2 shells (1 inch strip)
- On the both sides of the vertical wall of the aluminum angle in the small door.





Apply 2 plies of prepreg, 1 at a time, on all the inner surface of the part except on the aluminum that doesn't have adhesive film. It is not necessary to put prepreg in the cutting areas for the windows.

Begin at the bottom of the mold and go up the walls and fold back the plies on the contour of the part. For the incline part of the big door, offset the 2 plies by about 1 inch to facilitate the blending to the surface. Avoid to superpose the overlaps from the different plies. The overlaps must be of  $0.75 \pm 0.12$  inch. Avoid having more than two (2) folding per prepreg piece.



Lay carefully the prepreg plies to eliminate air pockets. The 90 degree corners need a particular attention. To really mold the plies against the walls in those spots and avoid the air bubbles, use an acrylic or teflon bar with a narrow end and press on the prepreg along the corners. Before doing the bagging, use an acrylic bloc with a slightly rounded 90 degree corner, press it in the corners and hit with the hammer so that the prepreg really matches the form.



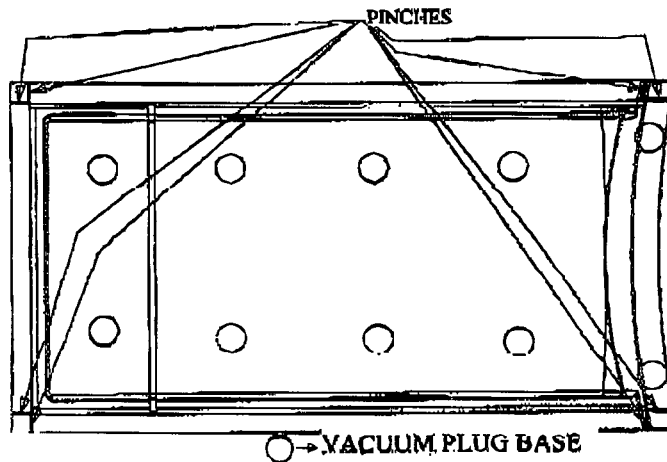
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## 8.2 Bagging and thermocouples

### 8.2.1 1<sup>st</sup> bagging

The 1st bagging must be done as followed :

- Do a notch in the last prepreg ply, about where one of the windows in the big door is, wrap the tip of the thermocouple into teflon adhesive tape and insert it in the notch under the prepreg (about ½ inch).
- Place the peel ply to cover all the prepreg surface and do a notch to let out the thermocouple upwards.
- Place the perforated film to cover all the peel ply and do a notch to let out the thermocouple upwards.
- Place the bleeder to cover the perforated film and do a notch to let out the thermocouple upwards.
- Position 10 vacuum plug bases inside the mold and place Lexan plates, about 4 x 4 inches, wrapped in bleeder under the bases to prevent marking the part and avoid the resin to clog the vacuum plug.



- Place the bag to cover all the top surface of the mold and hold in place using tacky tape. Allow about 3 feet more in length and in width for the bag so that it can easily take the shape of the mold without tension. First, bond the 4 corners of the bag and do two (2) pinches (rabbit ears), about 3 to 4 inches, in each corner. After, do pinches all around as required so that there is no tension in the bag.
- Do a small notch in the bag over all the vacuum plug bases and install the vacuum plug on the bases by making sure that the bag is well taut so that there is no air loss at the



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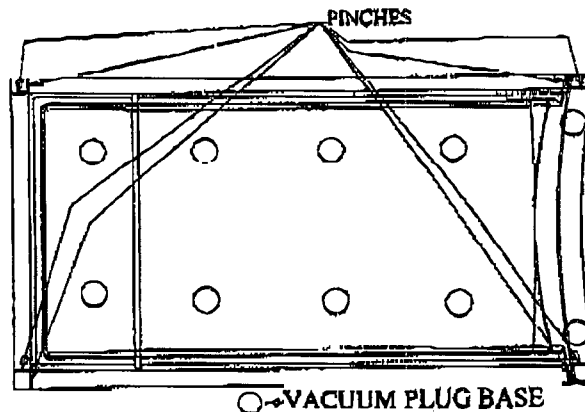
gasket level. Do also a notch to let out the thermocouple upwards and seal the notch with tacky tape.

- Connect the vacuum plugs and create a vacuum in the bag by distributing it as equally as possible and by minimizing the pinches size that will be formed during it. Make sure that there is no loss before sending to the oven.
- In the oven, connect all the vacuum plugs on the vacuum line and connect the thermocouple in the chart recorder socket. Make sure one last time that there is still no loss and verify the vacuum pressure in the bagging. It should be at 24"Hg minimum.
- Close the oven and start the curing process.

### 8.2.2 2<sup>nd</sup> bagging

The 2<sup>nd</sup> bagging must be done as followed :

- About where one of the big door windows is located, stick the tip of the thermocouple in the foam core (about 1/2 inch).
- Place the perforated film to cover all the foam core surface and do a notch to let out the thermocouple upwards.
- Place the bleeder to cover all the perforated film and do a notch to let out the thermocouple upwards.
- Position 10 vacuum plug bases inside the mold and place Lexan plates, about 4 x 4 inches, wrapped in bleeder under the bases to prevent marking the part and avoid the resin to clog the vacuum plug.



- Place the bag to cover all the top surface of the mold and hold in place using tacky tape.



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Allow about 3 feet more in length and in width for the bag so that it can easily take the shape of the mold without tension. First, bond the 4 corners of the bag and do two (2) pinches (rabbit ears), about 3 to 4 inches, in each corner. After, do pinches all around as required so that there is no tension in the bag.

- Do a small notch in the bag over all the vacuum plug bases and install the vacuum plug on the bases by making sure that the bag is well taut so that there is no air loss at the gasket level. Do also a notch to let out the thermocouple upwards and seal the notch with tacky tape.
- Connect the vacuum plugs and create a vacuum in the bag by distributing it as equally as possible and by minimizing the pinches size that will be formed during it. Make sure that there is no loss before sending to the oven.
- In the oven, connect all the vacuum plugs on the vacuum line and connect the thermocouple in the chart recorder socket. Make sure one last time that there is still no loss and verify the vacuum pressure in the bagging. It should be at 24"Hg minimum.
- Close the oven and start the curing process.

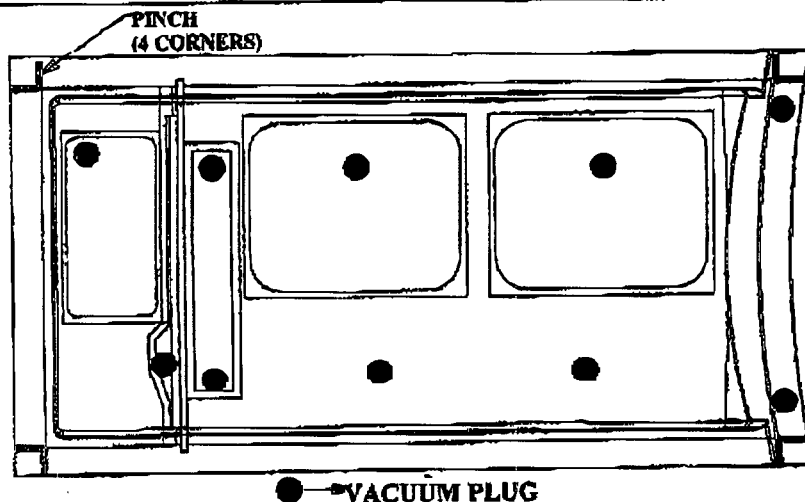
### 8.2.3 3<sup>rd</sup> bagging

The 3<sup>rd</sup> bagging must be done as followed :

- Bond the tip of the thermocouple with teflon adhesive tape in the trim area of one of the big door windows.
- Place the peel ply to cover all the prepreg surface and do a notch to let out the thermocouple upwards.
- Place the perforated film to cover all the peel ply and do a notch to let out the thermocouple upwards.
- Place the bleeder to cover the perforated film and do a notch to let out the thermocouple upwards.
- Position 10 vacuum plug bases inside the mold and place Lexan plates, about 4 x 4 inches, wrapped in bleeder under the bases to prevent marking the part and avoid the resin to clog the vacuum plug.



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- Place the bag to cover all the top surface of the mold and hold in place using tacky tape. Allow about 3 feet more in length and in width for the bag so that it can easily take the shape of the mold without tension. First, bond the 4 corners of the bag and do two (2) pinches (rabbit ears), about 3 to 4 inches, in each corner. After, do pinches all around as required so that there is no tension in the bag.
- Do a small notch in the bag over all the vacuum plug bases and install the vacuum plug on the bases by making sure that the bag is well taut so that there is no air loss at the gasket level. Do also a notch to let out the thermocouple upwards and seal the notch with tacky tape.
- Connect the vacuum plugs and create a vacuum in the bag by distributing it as equally as possible and by minimizing the pinches size that will be formed during it. Make sure that there is no loss before sending to the oven.
- In the oven, connect all the vacuum plugs on the vacuum line and connect the thermocouple in the chart recorder socket. Make sure one last time that there is still no loss and verify the vacuum pressure in the bagging. It should be at 24"Hg minimum.
- Close the oven and start the curing process.

#### 8.2.4 Local bagging

A local bagging can be done when at the time of a repair. To do so, proceed as followed :

- 1 ply of peel ply covering all the laminated surface.
- 1 ply of perforated film covering all the peel ply.



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- 2 plies of bleeder to cover all the perforated film.
- Position one or two vacuum plug bases as closed as possible from the repair without being on it. Put 3 to 4 layers of bleeder under the bases to avoid the resin to clog the plugs. If it's not possible to place the bases besides the repair, position them on the repair but add a Lexan plate about 4 x 4 inches in the bleeder to avoid marking the surface.
- Bond tacky tape about 1 inch all around the repair including the vacuum plug bases. Cut a bag about 3 inches bigger in length and width than the area defined by the tacky tape. First, bond the four (4) corners of the bag and make pinches (rabbit ears) as required so that there is no tension in the bag.
- Make a small notch in the bag over all the vacuum plug bases and install the vacuum plugs on the bases by making sure that the plastic is well taut so that there is no air loss at the gasket level.
- Connect the vacuum plugs and create a vacuum in the bag by distributing it as equally as possible and by minimizing the pinches size that will be formed during it. Make sure that there is no loss.

### 8.3 Curing procedures

For all the cures, record the temperature evolution on a chart provided for this.

*The curing temperature of the following recipes must correspond to the temperature indicated by the thermocouple inserted in the part.*

#### 8.3.1 1<sup>st</sup> cure

The first cure must be done according to the following parameters :

- Rise : 2 to 5 °F/minute
- Curing temperature : 260±10°F
- Curing length : 90 to 120 minutes
- Decrease : 8°F/minute max.

#### 8.3.2 2<sup>nd</sup> cure

The second cure must be done according to the following parameters :

- Rise : 3 to 6 °F/minute
- Curing temperature : 260±10°F
- Curing length: 45 minutes
- Decrease : no impact



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### 8.3.3 3<sup>rd</sup> cure

The third cure must be done according to the following parameters :

- Rise : 2 to 5 °F/minute
- Curing temperature : 260±10°F
- Curing length: 90 to 120 minutes
- Decrease : 8°F/minute max.

## 8.4 Repair of part lay-up

### 8.4.1 Type of defects

#### - Voids :

An *edge void* is a void, which is present on the boundary of the part. Edge voids greater than 0.5 inch in depth or 2 inches in length must be the object of a NCR and transmitted to Dart Aerospace for disposition. All other edge voids less than 0.5 inch in depth or 2 inches in length must be repaired by resin injection or removal and lay-up.

An *internal void* is a void, which is present within the boundary of the part. Internal voids less than 0.125 inch in diameter are acceptable. Voids greater than 0.125 inch in diameter but less than 2 inches must be repaired by resin injection or removal and lay-up. Internal voids greater than 2 inches in diameter must be the object of a NCR and transmitted to Dart for disposition.

#### - Crushed core :

Crushed core can be repaired as long as the damaged area corresponds to 5% of the surface or less. A damage area of more than 5% of the surface must be the object of a NCR and transmitted to Dart Aerospace for disposition.

#### - Delamination :

All delamination occurring within the boundaries of the part must be repaired.

### 8.4.2 Repair method

#### - Resin injection:

Drill two (2) holes using a #45 (0.082") drill at each end of the void and using a syringe, inject epoxy resin inside until the void is completely filled. Additional holes can be necessary to be sure to fill the entire void but always remember that you need one hole to inject and one hole to evacuate the air from the void.

#### - Removal and lay-up :

The void must be outlined using a pen or a marker but not a pencil. The mark area must be leveled until complete removal of the void. After, there is two possible options for repairing the damaged area :



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1. If there is a cure in the oven to come in the manufacturing process, include the repair in the lay-up stage or in the positioning of the internal components that precedes the next curing stage. Fill the void with pieces of prepreg corresponding to the amount of ply removed by the leveling and compact using an acrylic bloc and a hammer to be sure that the prepreg fills the void completely. Let cure according to the next curing stage in the process.
2. If there is no cure in the oven to come in the manufacturing process, using epoxy resin and a quantity of 9oz satin corresponding to the amount of ply removed by the leveling, do a wet lay-up on the area to repair and offset the plies to obtain an even surface with the one around the damaged area. After, make a local bagging as described in section 8.2.4. Let cure according to the epoxy resin manufacturer recommendations.

#### Crushed core :

1. If the damage is detected before the lay-up of the inner shell, include the repair in the lay-up stage. Fill the damaged area with the same core splice adhesive used to join the foam core parts or with the filler if the core splice adhesive is really not a suitable method. Follow with the manufacturing procedure as planned.
2. If the damage is detected after the lay-up of the inner shell, open the damage area and fill with the filler indicated in section 3.2. Even the surface and let cure according to the filler manufacturer recommendations. After, cut a quantity of 9oz satin corresponding to the amount of ply to replace. The dimensions of the first piece of 9oz satin must be at least bigger than the damaged area by 0.5 inch in length and width. The dimensions of the other pieces of 9oz satin must be added in length and width by 0.5 inch increment minimum. Do a wet lay-up on the damaged area by centering the 9oz pieces. Make a local bagging as described in section 8.2.4 and let cure according to the resin manufacturer recommendations. Finish to even the surface according to the door profil.

#### Delamination :

The area to repair must be outlined using a pen or a marker but not a pencil. Inject the epoxy resin under the delaminated surface and clamp everything. Use a piece of rigid wood, of a dimension greater than the delaminated area, to apply an even pressure on all the surface to repair. To avoid the resin to stick to the wood, place a Kydex piece, of same dimensions or greater than the piece of wood, between the surface and the piece of wood. Let cure according to the resin manufacturer recommendations. After, do a wet lay-up using the epoxy resin and a minimum of one (1) ply of 9oz satin. Make a local bagging as described in section 8.2.4 and let cure according to the resin manufacturer recommendations. Finish to even the repaired surface with the door profil.





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### 8.5 Triming and finishing

Trim and drill the doors as per drawing and remove all sharp edges by slightly sanding them.

### 8.6 Paint

The doors must entirely be painted using a high-build primer as indicated in section 3.2.

### 8.7 Packaging

- Wrap the doors in bubble or foam wrap and place in a wooden box. Make sure that the doors are stable in the box and that they won't move during transport. Pack the left and right sides in separated boxes.
- Add a copy of the duly completed process sheet in the box. If necessary, add the D3119-041/-042 cover assembly and the D3138-1/-2 both wrapped in plastic as well as their process sheet.

SIDE	DOORS	PARTS TO ADD
Left	D3140-05	D3138-1
	D3140-07	D3119-041
Right	D3140-06	D3138-2
	D3140-08	D3119-042

- Close the box by fixing the cover with nails and/or screws, and solidify everything with metallic or nylon straps.
- Fill and add the shipping documents according to the usual procedure.

Préparé par / prepared by <i>M. Laigne</i>	Date 2002-12-02	Approuvé par / approval by <i>[Signature]</i>	Date 2002-12-02
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